AMERICAN CHEMICAL SOCIETY

LEADERSHIP AWARD FOR SCIENCE INVOLVEMENT

December 7, 2016

Thank you all very much for this gracious award from the CME American Chemical Society …a very special thanks to your past chair of the CME Group, Mr. George Rodriguez, for his persistence and support of my nomination for this prestigious award as well as Dr. Thomas Connelly, Executive Director and CEO of the American Chemical Society, who pushed my nomination through your process.

First let me say that you all have a special place in my heart, because my daughter, Dr. Kelly Bolden, has a background in chemical engineering and is fellow alum with Mr. Rodriguez of the Chemical Engineering program at Georgia Tech.

When I first learned about your generous offer to present me with this award, an old saying came to mind. It's from Andrew Carnegie: *"Take away my people, but leave my factories, and soon grass will grow on the factory floors. [But] take away my factories [and] leave my people and soon we will have a new and better factory."*

For me, anything and everything that I've been able to do during my own involvement in the world of science and engineering is because of the incredible people with whom I've had the privilege to work.

This begins with our employees at NASA – 18,000 strong. It extends to our contractors … and it extends even deeper to our partners … partners in industry, partners in academia and partners in Space Agencies across the world.

This is why when I'm asked about my top priority for NASA, my first answer is always the same: it's our people.

It's for this reason, by the way, that like many of you, I'm passionate about inspiring more young folks to study the STEM subjects of science, technology, engineering and math.
It's been a priority of President Obama's and it's been something on which we've been working very diligently at NASA.

Now why bring this all up at a gathering sponsored by the business, investment and technology group? Because I don't know about you, but every time I turn on my television I seem to see another story about how people are divided … how we're divided as a country … how we're divided as a world.

One of the reasons I'm so passionate about science is because of all the ways science has the potential to bring people together.

It's an idea that's reflected in our vision statement at NASA: *"To reach for new heights for the benefit of all humankind".*

It's what inspires our chemical engineers and their associates at NASA as they work on projects ranging from propulsion systems to cryogenics to recycling. Chemical engineers know a thing or two about antidotes. I believe that chemical engineering and science in general can be an antidote for the divisions we've been feeling in our country and across the globe. It can bring the world together.

Let me share with you two statements that two former Space Shuttle crewmembers wrote about their experiences of seeing our planet from space. The first stated: *"The first day or two up there,"* and by "up there" the person who said was talking about being in space, "*you try to recognize the countries."* He then named his own country and said, quote "*It stands out.*

It's very distinct. Then, you keep missing the countries and you look only at the continents. By the sixth day, the whole world becomes a beautiful blue and white and yellow painting. Those boundaries really disappear." Now, I'd like to share something that was written by an astronaut from a different country: *"There is no better place to emphasize the unity of people in the world than flying in space. We are all the same people, we are all human beings and I believe that most of us, almost all of us, are good people."*

The first quote is from Prince Sultan Salman Abdulaziz Al-saud of Saudi Arabia after flying as a member of the STS-51G shuttle mission in June 1985. The second, by the late Israeli astronaut Ilan Ramon during his ill-fated STS-107 mission in January 2003.

Our science and space-related partnerships with other nations are working so well that our friends at the State Department have occasionally asked how we maintain the incredibly diverse yet effective international partnerships as we do. For all the difficulties we sometimes have getting along down here on Earth, aboard the International Space Station (ISS), we've had astronauts from different countries living and working together now for 16 years without interruption. Think about that for a moment.

If any of you have children or grandchildren 16 years old or less, they have not taken a single breath in their entire lives when at least a Russian cosmonaut and American astronaut have not been living and working together in space – usually accompanied by astronauts from other countries. What gets me really excited is the idea that their own children and grandchildren may very well live in a world where the idea that human beings are living and working together on Mars is just an everyday fact of life as well.

You see, at NASA we're on a Journey to Mars. Our goal is to send astronauts to the Red Planet in the 2030s and there is a new consensus emerging in the academic and policy communities around our plan, timetable and strategy for getting there.

Given that support for Mars is bipartisan – it's something that extends beyond political or economic sectors. It's my sincere hope that future leaders, both in the incoming administration and beyond, will also choose to support the international journey to Mars and to keep up the momentum we've been gaining.

Ever since President Barack Obama challenged NASA to send humans to Mars in the 2030s – as he did in what I consider to be a major space policy address at the Kennedy Space Center in April 2010 – we at NASA, along with our international partners, have made more progress toward this goal than anyone at the time could have expected.

As a result, we're closer to sending human beings to Mars today than anyone, anywhere, at anytime has ever been.

You may be familiar with the *Orion* crew capsule and the Space Launch System rocket, which will take our astronauts into deep space in the coming years. Well, they both continue hitting very important milestones in their production.

I want to make a very important point here. The human journey to Mars is not something that we believe any one sector or any one nation can or should do alone. In this way, it is perhaps the ultimate example of how science and exploration have the potential to bring the world together.

For starters, on my earliest days as NASA Administrator, President Obama directed NASA to work in partnership across all domestic sectors and international borders.

He asked us to work simultaneously on building the spacecraft capable of getting our astronauts to deep space and facilitate the success of a new commercial market in low-earth orbit. He also asked that we expand our partnerships to bring in non-traditional partners to the family of space-faring nations.

In facilitating the success of a commercial space market, he asked us to work with industry partners to return the launches of cargo and astronaut crews to American soil.

Today, Americans are working at more than 1,000 businesses across virtually every state to further these objectives. Our commercial partners have already delivered tens of thousands of pounds of cargo to Station – and we're getting very close to the launch of our crews on American launch vehicles from the Space Coast of Florida.

Once cargo arrives at the International Space Station it is being put to use by astronauts from all over the world who are working off the Earth, for-the-Earth. This work is part of the first stage of our journey to Mars, a stage we call 'Earth Dependent'. The U.S. segment of the ISS is now designated a National Laboratory by act of the U.S. Congress. As part of the National Lab Pathfinder program, we have conducted pharmaceutical research such as that done to develop a candidate vaccine to combat salmonella or one to fight Duchenne's muscular dystrophy. Protein crystal growth – largely in the Japanese Experiment Module (JEM) – is opening doors to development of pharmaceuticals like never before.

The next stage will take place in the next decade when we at NASA will move our focus into what's called cis-lunar space, the area around the moon. We'll be working with partners from American industry, academia and other space agencies to test the technologies that drive both exploration and economic growth.

Our focus will include everything from advanced propulsion systems to habitats to medical advances. Just in the past six months, NASA astronaut Dr. Kate Rubins performed the first gene sequencing in space while working on the ISS.

Meanwhile, we envision an even larger role for industry partners in low-earth orbit.

We also will be working in tandem with partners from across the world and across sectors when we reach the final stage of our journey; the 'Earth Independent Stage' when our astronauts reach Mars.

Now these are all ways that science and technology development can bring us together. I do not have to remind anyone here that science and the advancement of technology can also be used to drive us further apart.

When it comes to issues like climate change, the very same science that can be put to use to save lives, create jobs and save our planet, can also be put to use to undermine the progress we have made thus far; to increase our carbon footprint and emit more poison into our atmosphere. Technology can be used to make weapons of mass destruction while at the same time, it can also be used to bring hope and healing to the masses.

Advances in technology will make it possible to fly across the world in only six hours – all while emitting less pollutants and flying on cleaner fuels. It can also be used to drop bombs on our enemies.

In my lifetime I've traveled to space; I've also gone to war. I grew up during our nation's "space race" with the Soviet Union. At that same time our nation suffered through a long period of division and hatred over civil rights. Years later, I was honored to fly aboard the first joint American-Russian shuttle mission.

How we use the science and technology all of us are a part of developing … how we view progress and how we choose to move forward … these questions are ultimately yet to be determined.

I began with a quote from two astronauts – one Israeli and one Saudi Arabian.

I want to leave you with a quote from a fellow American – or to be more specific, a prominent American newspaper.

"For a moment it seemed that all men were brothers … Communist journalists congratulated American scientists. Israeli photographers beamed at Egyptian broadcasters. Brown hands grasped white ones and few eyes were dry … the word went out in 30 languages to 1535 radio and television networks to 1056 newspapers and to 445 magazines in 57 countries".

This was written in the Houston Chronicle on July 21, 1969 – the day after the moon landing. Neil Armstrong, Buzz Aldrin and Michael Collins had reached the moon in times that weren't easy.

A year earlier we had lost Dr. Martin Luther King, Jr. and Robert F. Kennedy to assassins' bullets. As American astronauts flew into space in the summer of 1969, American pilots were flying sorties Vietnam – and too many, including some of my friends, paid the ultimate price.

So as all of you keep up your noble, important, world-changing work, I hope that you will continue to choose to be voices for progress and for using the power of science to bring people together.

Together, we can leave a world to our children and grandchildren that allows them to breath cleaner air; work in higher paying jobs; and gain a deeper understanding of our place in the universe.

Perhaps we can even help them answer the age-old question of whether there is life beyond Earth. Alternatively, we can give in to the ways of division, apathy and atrophy.

I am the eternal optimist! I grew up during segregation and today I'm NASA's first African-American Administrator – and I serve under our first Black President.

I believe that ultimately, we the people of the greatest country in the world will choose a path of progress and discovery … and that like the people of NASA, we will work together to make the impossible possible and turn science fiction into science fact.

Thank you all very much.